

REMARKS

Applicants have carefully reviewed the Final Office Action mailed December 23, 2003 (paper no. 1203). Applicants thank Examiner Bissett for her allowance of claims 39-45 and 60-61 and her indication of allowable subject matter in claims 48 and 55. In response to the Office Action, Applicants have amended claims 46 and 53. Claims 48 and 55 are canceled. By way of these amendments, no new matter has been added. Accordingly, claims 1-47, 49-50, 52-54, 56-57 and 59-61 remain pending in this application. Applicants respectfully request reconsideration of the present application in view of the above amendments and the following remarks.

Allowable Subject Matter

Claims 48 and 55 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 39-45 and 60-61 were allowed. Allowed claims 60 and 61 already contain the limitations of claims 48 and 55, written in independent form. Accordingly, Applicants have cancelled claims 48 and 55.

Claim Rejections under 35 U.S.C. §103

Claims 1, 3, 5-17, 19, 22-30, 33-34 and 36 were rejected under 35 U.S.C. §103(a) as being unpatentable over Pellegrini et al., (U.S. Patent No. 4,197,178) in view of Ying et al. (U.S. Patent No. 6,183,901). Applicants respectfully traverse the rejection.

Independent claims 1, 17, 22, and 33 are rejected under 35 U.S.C. §103(a) as being unpatentable over Pellegrini in view of Ying. The Applicants respectfully traverse the rejection with respect to the subject matter of independent claims 1, 17, 22, and 33 because there is no motivation to combine the Pellegrini and Ying patents and further, the Ying patent is non-analogous art.

MPEP Section 2143 sets forth the basic requirements for the Patent and Trademark Office to establish *prima facie* obviousness as follows: "To establish a *prima facie* case of obviousness, three criteria must be met. First, there must be some suggestion or motivation,

either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

There is no motivation or suggestion to combine the Pellegrini and Ying patents to result in the claimed invention set forth in independent claims 1, 17, 22 and 33. First, The Pellegrini patent teaches gas-impermeable separator plates having a heat-curable coating. As admitted by the Examiner, the Pellegrini patent fails to mention coatings cured by methods other than heating, such as radiation as specifically claimed in the present application.

To fill the deficiencies in Pellegrini, the Examiner relies on the Ying. However, the presently claimed invention is distinct from Ying. Independent claims 1, 17, 22 and 33 all specifically include a precursor coating that is applied to at least a first side of a fuel cell plate. In the present specification at page 5, lines 13-14, it states that "[e]ach of the fuel cells 102 includes a multi-layer active portion 104 sandwiched between a pair of bipolar plates 106 or between a bipolar plate 106 and an end plate 108." Further, the active portion 104 is described as including a membrane electrolyte assembly (MEA) 110 disposed between two backing layers 112. The MEA 110 may include a polymer electrolyte membrane (PEM) 114 disposed between an anode 116 and a cathode 118. As can be seen from the above description the active portion is different from the bipolar or end plates 106, 108.

At page 6, lines 3-4, the present application discloses that a coating 132 is applied to either or both surfaces of the fuel cell plates 106 and 108. As discussed at page 6, lines 4-6, the purpose of the coating 132 is to prevent the mixing of disparate fluid streams during the operation of the fuel cell. Furthermore, at page 2, line 22, the plates are described as gas-impermeable and as having channels that distribute fluids to the active portion. From this, it is apparent that the fuel cell plates 106 and 108 and coating 132 are not porous to gases or liquids; otherwise, the fuel cell would not operate correctly.

Despite the Examiner's assertion to the contrary, Ying does not disclose the application of a coating to a fuel cell plate. In the abstract, Ying discloses that the protective coating is applied to a separator. At column 1, lines 47-50, Ying defines a separator as the part of the electrolyte element that separates or insulates the anode from the cathode. The electrolyte element is also disclosed to include an aqueous or non-aqueous electrolyte in the pores of the separator. See column 1, lines 47-50. Ying further makes clear, at column 1, lines 36-38, that the electrolyte element is interposed between the anode and the cathode. From the abstract and background of Ying, it is clear that that electrolyte element and the protective coating are similar to the MEA as discussed in the present application. The MEA 110 is disposed between the anode and the cathode in the same way that the electrolyte element of Ying is disposed between the anode and the cathode. Because the electrolyte element includes the protective coating, the protective coating of Ying is also disposed between the anode and the cathode. In contrast, the coating 132 of the present invention is not disposed between the anode and the cathode but rather is disposed on the gas impermeable plates 106 and 108 that separate respective active portions 104 from each other. In sum the protective coating of Ying is utilized in a wholly different area of the fuel cell from the coating 132 in the present application. As such, it is non-analogous art.

In addition, the protective coating of Ying is porous. The Examiner's attention drawn to column 13, line 65 to column 14, line 22, where Ying states that "[s]uitable polymeric protective coatings should add flexibility and toughness to the separator while at the same time allowing, cations, such as lithium ions, to pass through the separator." Furthermore, at column 14, line 53, Ying acknowledges that the protective coating has a certain required amount of porosity. A coating that is porous can hardly function in place of a coating that is selected specifically because it is non-porous.

Applicants also respectfully disagree that the microporous layers of Ying's invention would read on a "plate" and thus support anticipation of the present invention. Although comprised nominally of metal oxides, the microporous layers in Ying are in fact formed from liquid solutions, (e.g., Ying column 20, lines 63-64; column 21, lines 10-11) which are "dried" (e.g., column 21, line 18) to form very thin "coating" layers that contain pores that are substantially continuous across the entire layer (column 16, lines 50-54). The microporous layers readily absorb liquids, as indicated by the calculation of pore volume by measuring the increase in weight of the layer upon addition of liquid (e.g., column 16, line 65-column 17, line 11). Due

to its porosity, the microporous layer is further described as functioning as an “ultrafiltration membrane” column 18, line 14). Nowhere does Ying teach or suggest that its microporous layers are “plates”, nor would one of ordinary skill in the art consider them “plates” in view of their membrane-like nature and porosity.

Thus, it can be seen that Ying discloses a coating for use in a completely different area and with a completely different function from the coating 132 of the presently claimed invention. As such, there is no motivation or suggestion to combine the teachings of the Pellegrini regarding gas-impermeable separator plates having hardeners and receiving heat with Ying regarding porous separator plates receiving infrared radiation. For at least these reasons, the rejection under 35 U.S.C. §103(a) of the subject matter of claims 1, 17, 22, and 33 is overcome. Dependent claims 3, 5-16, 19, 21-30, 34, and 36 all depend from patentable independent claims 1, 17, 22, and 33. The dependent claims each add additional limitations that are separately patentable. Accordingly, withdrawal of the rejection is respectfully requested.

Claims 1, 3, 5-17, 22-30 and 33-34 were also rejected under 35 U.S.C. §103(a) as being unpatentable over Breault et al. (U.S. Patent No. 4,233,369) in view of Ying et al ‘901. The Applicants respectfully traverse this rejection, as well.

The arguments made above with respect to the Pellegrini and Ying combination are applicable to this rejection, as well. For example, Breault et al. also teaches the use of “gas impervious graphite plates” that are coated with an adhesive, where the adhesive is cured with heat. As admitted by the Examiner, Breault et al. fails to disclose curing the adhesive coating with any other method other than heat, which teaches away from Applicants’ invention that requires curing the coating precursor with radiation. Indeed, Breault teaches the use of “low temperature” heat-curable adhesives to prevent the warpage problem. As such, there is simply no motivation to combine the teachings of Breault. Further, Ying is directed to coatings for porous separator sheets, not fuel cell plates. As such there is no motivation to combine Breault with Ying, absent Applicants’ own disclosure. Accordingly, withdrawal of the rejection in view of the Breault/Ying combination is respectfully requested.

Claims 1-4, 6, 9-14, 17-25 and 28-38 were rejected under 35 U.S.C. §103(a) as being unpatentable over Pellegrini in view of Boldt. The remarks presented above with respect to

Pellegrini and its limited teaching of heat-only curable coatings are also applicable to this ground of rejection. Moreover, Boldt does not fill all the gaps in Pellegrini. As demonstrated above, Pellegrini only teaches the use of heat curable coatings for fuel cell plates. Moreover, combining Pellegrini with Boldt will not produce the presently claimed invention. Boldt neither discloses nor suggests moving the gasket to a non-porous fuel cell plate. As such there is no motivation to combine the teachings of Pellegrini and Boldt.

Because Pellegrini and Boldt do not teach or suggest each feature of the presently claimed invention, the Examiner fails to establish a prima facie case of obviousness. See MPEP §2143. Accordingly, Applicants respectfully request that this rejection be withdrawn.

Claims 46-47, 52-54 and 59 were rejected under 35 U.S.C. 103(a) as being unpatentable over Shustack (U.S. Patent No. 5,128,387) in view of Clubley et al. (U.S. Patent No. 4,719,036) 34). Claims 49-50 and 56-57 were also rejected under 35 U.S.C. 103(a) as being unpatentable over Shustack '387 in view of Clubley et al. '036 as applied to claims 46-47, 52-54, and 59 above, and further in view of Shustack (U.S. Patent No. 5,128,391). Applicants respectfully traverse the rejections.

Applicants respectfully disagree with the Office Action's position that the added limitation "for coating a non-metallic substrate" does not define over the art. Shustack I specifically limits its disclosure to a coating composition for *metal surfaces*:

The present invention relates to a radiation curable coating composition for metal surfaces and to a process for preparing such coated metal surfaces. *Col. 1, lines, 11-13.*

Thus, there is no motivation for one skilled in the art to look at coating for *metal surfaces* to come up with the claimed invention, absent Applicants' disclosure. Indeed, Shustack I is non-analogous art. Specifically, one skilled in the art of forming coatings for non-metallic substrates would not look to the art of inks and protective coatings for metal beverage cans. Clubley and Shustack II are also limited to providing coating for *metal surfaces* and as such are also non-analogous art. Accordingly, Applicants respectfully request withdrawal of the rejection.

CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-0013, under Order No. 60680-1407 from which the undersigned is authorized to draw.

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Respectfully submitted,

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